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## (54) HEAT EXCHANGER AND HEAT PUMP APPARATUS

(57) A heat exchanger and a heat pump device that, with a small number of components, are capable of sending a refrigerant in a direction in which a plurality of heat transfer tubes are disposed side by side, the plurality of heat transfer tubes being connected to a header. An outdoor heat exchanger (11) includes a liquid header (30). The liquid header (30) includes a first liquid-side member (31) that includes a liquid-side flat-tube connection plate (31a) to which a plurality of flat tubes (28) are connected, a seventh liquid-side member (37) that includes a liquid-side external plate (37a) positioned on a side opposite to the flat tubes (28), and a fourth liquid-side member (34) that includes a fourth internal plate (34a) positioned therebetween. The fourth internal plate (34a) includes a first penetrationportion (34o) extending in a direction in which the plurality of flat tubes (28) are disposed side by side. The first penetrationportion (34o) has an introduction space (34x), a nozzle (34y), and an ascending space (34z) that are disposed side by side in order in the direction in which the plurality of flat tubes (28) are disposed side by side. The width of the nozzle (34y) is smaller than the width of the introduction space (34x) and is smaller

than the width of the ascending space (34z).

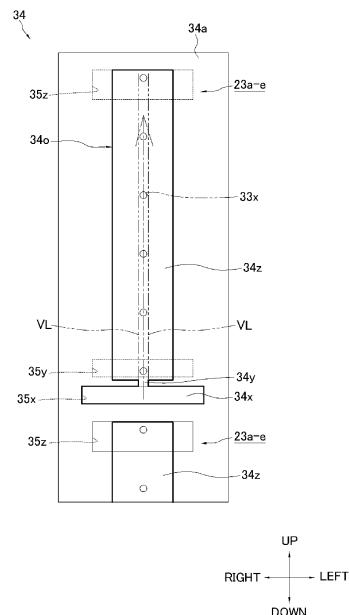


FIG. 14

(52) Cooperative Patent Classification (CPC): (Cont.)  
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## EUROPEAN SEARCH REPORT

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DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
10 X	EP 2 998 680 A1 (MITSUBISHI ELECTRIC CORP [JP]) 23 March 2016 (2016-03-23) * figure 5 * -----	1-12	INV. F25B39/00 F28F9/02 F28F9/22
15 X	WO 2018/116413 A1 (MITSUBISHI ELECTRIC CORP [JP]) 28 June 2018 (2018-06-28) * figures 3, 11 * -----	1-3	
20 A	US 2015/300758 A1 (HOFMANN HERBERT [DE] ET AL) 22 October 2015 (2015-10-22) * figure 3 * -----	1	
25 A	CN 203 940 771 U (MITSUBISHI ELECTRIC CORP) 12 November 2014 (2014-11-12) * figure 17 * -----	1	
30			TECHNICAL FIELDS SEARCHED (IPC)
			F28F
35			
40			
45			
50 1	The present search report has been drawn up for all claims		
55	Place of search Munich	Date of completion of the search 21 November 2024	Examiner Martínez Rico, Celia
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ON EUROPEAN PATENT APPLICATION NO.

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21-11-2024

10	Patent document cited in search report	Publication date	Patent family member(s)	Publication date
15	EP 2998680 A1 23-03-2016	CN 203940770 U EP 2998680 A1 JP 6005268 B2 JP WO2014184918 A1 WO 2014184918 A1	12-11-2014 23-03-2016 12-10-2016 23-02-2017 20-11-2014	
20	WO 2018116413 A1 28-06-2018	CN 110073154 A EP 3561412 A1 ES 2900343 T3 JP 6782792 B2 JP WO2018116413 A1 US 2020072507 A1 WO 2018116413 A1	30-07-2019 30-10-2019 16-03-2022 11-11-2020 27-06-2019 05-03-2020 28-06-2018	
25	US 2015300758 A1 22-10-2015	CN 104848710 A DE 102014203038 A1 US 2015300758 A1	19-08-2015 20-08-2015 22-10-2015	
30	CN 203940771 U 12-11-2014	NONE		
35				
40				
45				
50				
55				

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82